

Thoughts on Election Audits

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General observations

- Auditing of elections is a general concept
 - Poll closing: #voters = #votes?
 - Precinct results vs. reported results.
 - *Ballots/records vs. electronic results.*
 - This will be my main focus.
 - "Audit" has come to mean this, but we probably need a more precise word.
- Theory vs. practice
 - Many issues besides statistics.
 - Concepts need to be tested in real elections.
- Optimal auditing will require:
 - New rules from SoS
 - Legal changes
 - Buy-in from local election officials
 - Citizen participation
- We should aim for continuous improvement - not a one-time fix.
- I have more questions than answers.

Issues

- Goals of audits
- Logistical issues
- Chain of custody
- Audit followup
- Silly issues
- Innovation

Goals of random audits

- Show with high probability that electronic counts are accurate.
 - Show that 100% manual count will not change result.
- Early detection of problems
 - with equipment
 - with procedures
 - with people

The divide: auditing elections that are not close.

Logistical issues in California

- Based on experience in San Mateo County, 2006. Problems will vary by county.
- Election complexities create auditing difficulties.
- Steps
 - All ballots counted, precinct results reported
 - Public random selection (10-sided dice)
 - Public manual count of selected precincts.
- Problem: Counting takes a long time
 - Absentee ballots take a long time (esp. election-day).
 - Sorting by precinct
 - Inspecting undervoted/overvoted ballots
 - Provisional ballots
 - Manual audit is late in process and compressed
 - Solution: Lengthen canvass? Same-day registration?

Chain of Custody

- Audit happens weeks after election
- How do we ensure the integrity of the audited records?
 - How are ballots, VVPRs secured?
 - How is this publicly verified?
 - Absentee ballots are particularly problematic.

Dealing with discrepancies

This is a broad and difficult issue with few clear rules.

- Resolutions of minor problems should be documented, public (e.g., scanner mis-read).
- Rules needed for more extensive audits.
- Rules/procedures for forensic investigation, reporting on results.
- Needs a fair challenge process
 - Candidates/parties
 - Independent entities?
- Challengers need access to information
 - Detailed election data
 - Problem reports
 - Source code?
- Need clear legal standards for overturning election or "re-do"

Silly issues

- Some election management software does not report enough different classes of ballots for auditing.
 - Each class of ballots that is audited separately should be reported separately (by "batch")
 - Existing software doesn't handle this in some cases.
 - This is mundane, but it's hard to change software fast because of certification issues.

Innovation

Small elections are inefficient to audit.

- There are few precincts, so you have to manually count many (or all) of them to achieve reasonable confidence.
- Auditing individual ballots (batches of size 1) would be vastly more efficient (Neff, Walmsley, Cordero, Wagner)
- Certified equipment, law, procedures, are not yet up to the task.
 - Print number on ballot at scanning time.
 - Post scanned ballots on web.
 - Randomly compare paper ballots and posted ballots.

Concluding remarks

- Lots of high-quality thought going into statistical aspects of the problem.
 - Prediction: ideas will continue to improve.
- Many unanswered questions:
 - Logistics, reducing election complexity.
 - Follow-up on problems revealed by audit.
 - Unnecessary technological limitations
- Ideas need to be tested in real elections.

Audit basics

- Divide ballots into “batches”
 - Could be: precincts, machines, stacks, individual ballots.
 - Batches = precincts in California now.
 - Smaller batches = fewer ballots to count for same confidence.
 - Other factors argue for larger batches
- Report counts of “batches”
 - “commitment”
- Randomly select batches
 - Confidence depends on *number of batches*, not percentage of batches or ballots.
- Compare manual counts with committed results.
- “Deal with” discrepancies.
 - Many unresolved issues!